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Measuring Student Achievement:

Comparable Test Results for Participating SREB States and the Nation

A Report of the
Southern Regional Education Board/National Assessment of Educational Progress
1987 Program with

Arkansas, Florida, Louisiana, North Carolina,
South Carolina, Tennessee, Virginia, West Virginia

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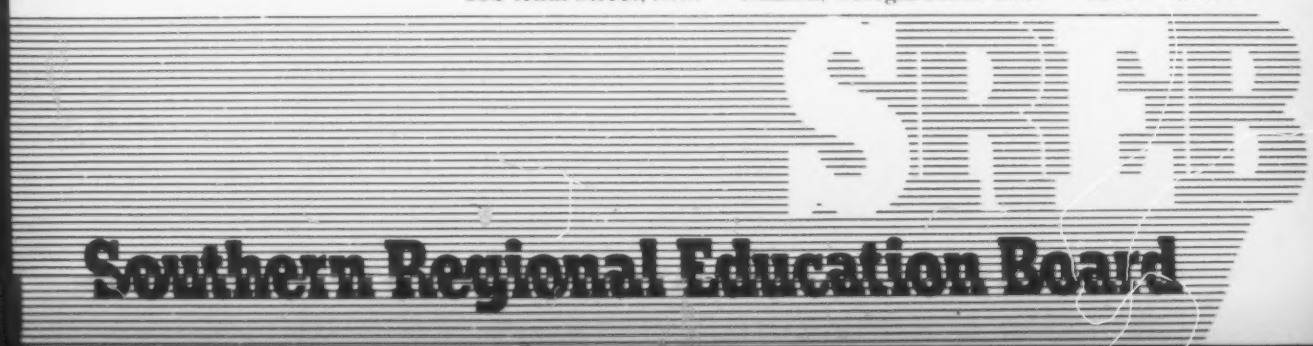


FOREWORD

Southern Regional Education Board states have been leading the way to create a new approach to measuring student achievement. With this new approach state leaders can know how their students' achievement compares to that of current, truly national results, to regional results, and to results in other states. Measuring student achievement in this way has not been possible before--not possible, that is, until several SREB states proved that states could, and would, administer the same test at the same time to a scientifically selected sample of students at the same grade level. With this kind of program states can obtain comparable state-by-state results that can also be compared to national results.

In 1987, eight Southern Regional Education Board states (Arkansas, Florida, Louisiana, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia) and the National Assessment of Educational Progress (NAEP) tested representative state samples of 11th-grade public school students in United States history and mathematics. Approximately 16,000 students in nearly 700 public schools were tested. In two previous years SREB states measured the reading and writing achievement of 11th-grade students.

Results from the 1987 SREB/National Assessment project show achievement scores in most of the participating SREB states were at or above the national averages for public school students who took the 1986 National Assessment of Educational Progress test in United States history. For mathematics, average scores for half of the participating states were at or above the national average. These national averages are the most current and nationally representative results available.

For the participating SREB states and the nation, the results underscore one obvious fact--students know more about subjects that they have studied and have been taught in school. Students who have completed a United States history course in high school know more historical facts than those who have not. Students who have completed algebra and geometry are able to solve more mathematical problems than those who have not. Obvious conclusions, yes--but important ones as states implement higher course standards in schools and colleges.

The 1987 SREB/National Assessment project results also underscore the continuing concern for the achievement levels of black students. The average mathematics score

for black students in each of the eight participating SREB states was at or significantly above the average score for black students in the nation. But in both mathematics and United States history the achievement of black students trails that of white students by a large margin. The 1986 SREB/National Assessment project to measure reading achievement showed that the reading proficiency of 11th-grade black students was at basically the same level as that for 7th-grade white students. SREB's conclusion was that this discrepancy in reading achievement between black and white students is unacceptable. The same is true a year later for achievement in mathematics and United States history.

An encouraging development is that the effort begun by the Southern Regional Education Board states may soon lead to a nationwide program to measure student achievement. A nationwide program could give state educational and governmental leaders, and the public, new information about student achievement and educational progress. The Council of Chief State School Officers has received a grant from the United States Department of Education to prepare the first phase of a nationwide state-based assessment in conjunction with the National Assessment of Educational Progress. The nationwide program is expected to begin by testing mathematics (one of the areas tested in the 1987 SREB/National Assessment project). The Southern Regional Education Board is on record as urging its member states to be among the first to participate in the nationwide program.

More than three years ago the Southern Regional Education Board and its Legislative Advisory Council endorsed establishing the nation's first state-by-state testing program in conjunction with the National Assessment of Educational Progress. At that time few others voiced support for this idea. But the members of the Southern Regional Education Board and the SREB Legislative Advisory Council were instrumental in supporting the project and encouraging state participation. Several chief state school officers and state testing directors in SREB states helped make the project possible by stepping forward to shape an idea into a program.

I am convinced that given a better system for measuring educational progress, SREB states will show results that will help build long-term public support. Now we must work to see that results reflect successful outcomes of our continuing efforts for educational improvement.

Winfred L. Godwin
President

INTRODUCTION

Several states now have results that show how their students' achievement in United States history and mathematics compare with current national results and to results in other states. Those states--Arkansas, Florida, Louisiana, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia--have information about their 11th-grade students that is currently not available in other states in the nation.

The generally encouraging results from the 1987 SREB/National Assessment project should not be taken lightly by state leaders. Neither should they be cause for any prolonged congratulations that shift the focus away from what remains to be done to improve education. That many of the eight participating SREB states are at or significantly above a current and representative national average in U.S. history and mathematics achievement is good news for these states. But two facts must temper this good news--these national averages reflect a less than extraordinary level of achievement and average scores for black students in the SREB states and the nation trail significantly the scores for white students.

- History achievement for 11th-grade public school students was at or significantly above the national average in seven of the SREB states participating in the 1987 SREB/National Assessment project. The national average on the history achievement assessment was, however, not at a level that most would deem satisfactory--on average, students correctly answered only 55 percent of the questions.

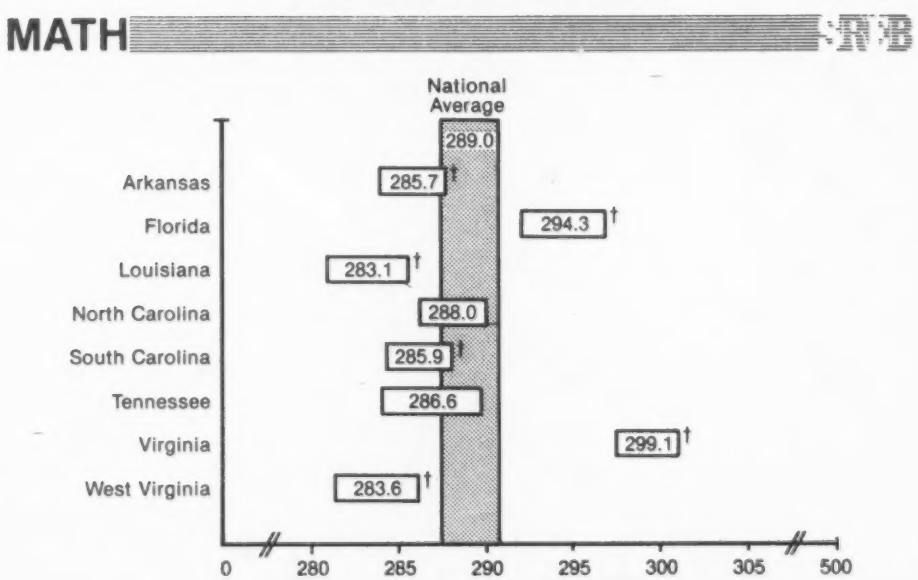
- Mathematics achievement for 11th-grade public school students was at or significantly above the national average in four of the states participating in the SREB/National Assessment project.

- In every one of the participating SREB states, the mathematics scores for black 11th-grade students were at or above the national average for black 11th-graders. But the large gap--both in the SREB states and the nation--between the scores of black and white students emphasizes the seriousness of a problem in our society and is a challenge to states' educational improvement programs.

MATHEMATICS ACHIEVEMENT

The mathematics achievement of 11th-grade public school students in four of the eight participating SREB states is at or above the national average for public school students. This is the finding of the 1987 SREB/National Assessment of Educational Progress project for students tested in Arkansas, Florida, Louisiana, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia (Figure 1). Mathematics achievement scores in six states varied by about five points (from 283 to 288) on the 500-point National Assessment scale. Florida and Virginia students scored 294 and 299, respectively, and were significantly above the national average of 289.

Figure 1
Average* Mathematics Scores for
11th-Grade Public School Students
in SREB States Participating in
SREB/National Assessment Project, 1987



*The range depicted around each average is a statistical measurement representing plus or minus two standard errors, meaning one can be 95 percent sure that the average falls within this range.

†Significantly different from the national average, based on a statistical test (Alpha = .05). Although the averages for Arkansas and South Carolina overlap the national average, they are still significantly different from the nation.

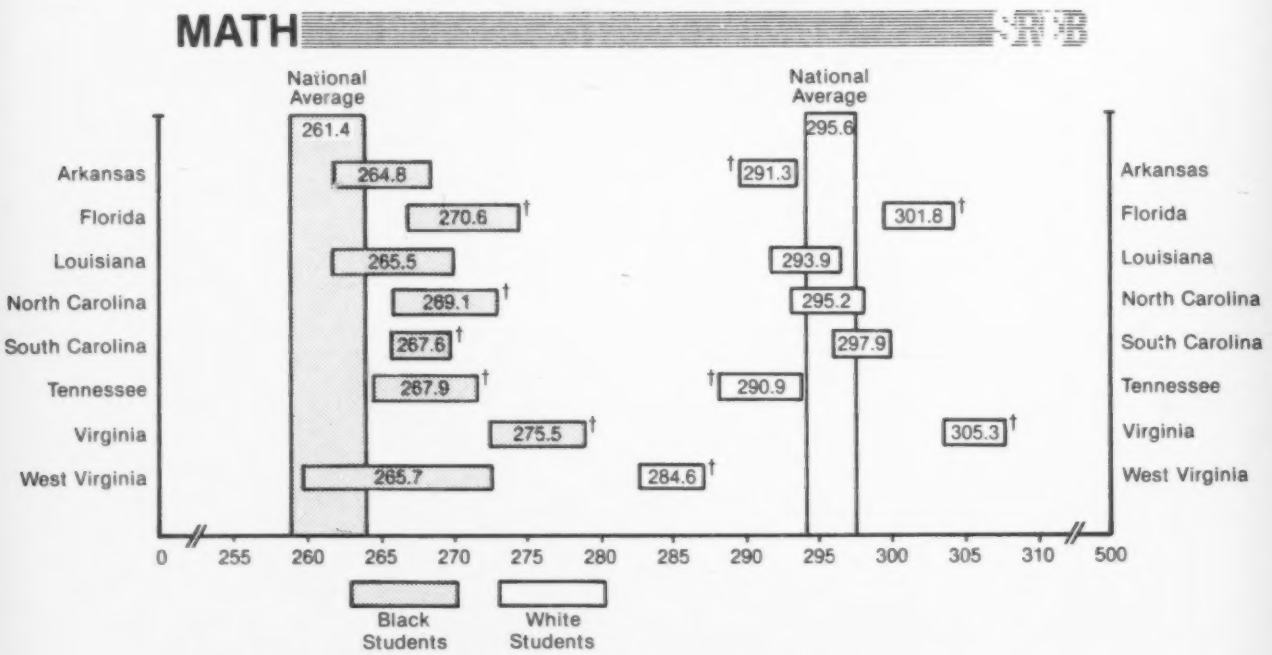
Results on mathematics achievement from the eight participating SREB states show that:

- **Black 11th-grade students in a majority of SREB states (Florida, North Carolina, South Carolina, Tennessee, and Virginia) scored significantly above the national average for black 11th-graders. Black students in Arkansas, Louisiana, and West Virginia were at the national average.**

- **White 11th-graders in Louisiana, North Carolina, and South Carolina scored at the national average for white students; white students in Florida and Virginia were significantly above the national average.**

- **In every participating SREB state and in the nation, the gap between the mathematics achievement of black and white students was large (Figure 2).**

Figure 2
Average* Mathematics Scores for
11th-Grade Black and White Public School Students
in SREB States Participating in
SREB/National Assessment Project, 1987



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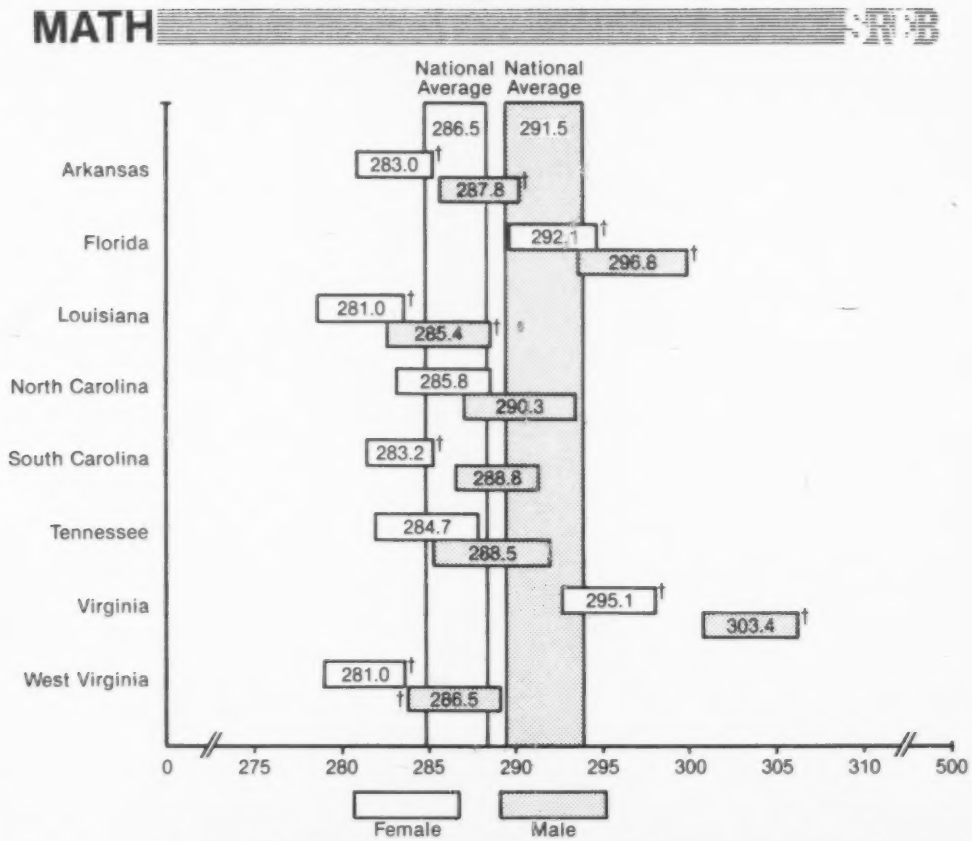
†Significantly different from the national average, based on a statistical test (Alpha = .05).

- **Males outscored females in every SREB state and in the nation. The differences in mathematics achievement (about 5 points on a 500-point scale) in the SREB states were consistent with the national results. Mathematics scores for males and females in Florida and Virginia were significantly above the average for their national counterparts (Figure 3).**

Figure 3
Average* Mathematics Scores for
11th-Grade Female and Male Public School Students
in SREB States Participating in
SREB/National Assessment Project, 1987



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†Significantly different from the national average based on a statistical test (Alpha = .05). Although Arkansas and South Carolina females and Arkansas and Florida males overlap the national average, they are still significantly different from the nation.

The 1986 national NAEP mathematics assessment and an explanation of what it means when students score at given levels on a scale of 0-500 will be released by the National Assessment of Educational Progress in 1988. The National Assessment explanation will give the eight SREB states important additional information about college readiness and students' skill levels. The first analysis of just the SREB states' results is contained in this report and shows how many students are able to answer or solve particular types of mathematics problems (Table 1).

Most 11th-grade students can multiply numbers like 256 x 15, multiply 2-digit numbers by fractions, and add signed numbers. Students are able to read information from tables and answer simple logic questions.

However, only about one-half or less of the students were able to:

- o calculate simple interest on a loan;
- o change a decimal to a percent;
- o know the approximate square root of a 2-digit number;
- o or use several pieces of information from a table to work a problem.

Table 1
Mathematics Assessment--Percentage of 11th-Grade Students Who Could:

	U.S.	AR	FL	LA	NC	SC	TN	VA	WV
Use simple logic	86%	89%	90%	90%	89%	87%	90%	91%	88%
Calculate percentage	68	68	77	66	73	65	71	77	69
Determine angles in a triangle	49	48	56	52	52	47	50	60	43
Calculate simple interest on loan	36	37	50	35	40	39	38	44	37
Convert square yards into square feet	26	21	28	17	22	20	22	26	22
Find area of L-shaped figure	26	17	29	13	21	23	21	31	18
Solve algebraic equation with one unknown	22	18	22	19	20	20	20	27	19

Higher order problems posed difficulties for students. Less than one-fourth (and often only 20 percent or less) of the students could work a simple algebra problem with one unknown, calculate the area of an L-shaped figure, or convert square feet into square yards.

Mathematics Courses Students Are Taking in High School

Students were asked about what courses they completed, their attitudes toward mathematics, and how their mathematics classes were taught. The responses could not be checked for accuracy through studies of student course transcripts or classroom observations, so they should be viewed as only one piece of information in drawing conclusions.

Instructional methods in mathematics' classrooms show a similar pattern across the SREB states and the nation, according to what students reported when asked on the National Assessment test. Eighty to ninety percent of students reported that they often (as opposed to sometimes or never) watch the teacher work mathematics problems on the board and listen to explanations. About one-fourth of the students reported that they often get individual help from teachers; some 15 percent said they never get individual help with mathematics. Approximately 10 percent more black students reported "getting help often" than did white students.

The student information does give an insight into the relationship between courses students take and mathematics achievement. Students in the participating SREB states who reported being in an academic high school program ranged from a low of 44 percent in one state to a high of 57 percent in another; 31 to 48 percent reported being in a general high school program; between 7 and 16 percent in vocational/technical programs (Table 2). More females than males were in academic programs; more males were in vocational/technical programs. A larger percentage of black students than white students were enrolled in general or vocational programs.

In the eight participating SREB states and nationally, mathematics achievement for students reporting that they were in an academic program was considerably higher than for those in general or vocational programs (Figure 4). However, achievement for students reporting to be in academic programs in most SREB states was significantly below the national average. Most SREB-state students enrolled in general or vocational/technical programs scored at or above the national averages for students in similar programs nationwide.

Table 2
Percent* of 11th-Grade Public School Students
Enrolled in Academic (A), General (G), and Vocational (V) Programs,
by Total and Race, *as Reported by Students*
in SREB States Participating in
SREB/National Assessment Project, 1987

	Total			Black			White		
	A	G	V	A	G	V	A	G	V
Arkansas	45%	48%	8%	43%	46%	11%	45%	48%	7%
Florida	52	40	7	52	40	8	53	40	7
Louisiana	51	42	7	49	44	7	53	41	6
North Carolina	54	32	13	48	37	14	57	30	13
South Carolina	54	35	12	44	42	14	60	30	10
Tennessee	44	41	15	44	33	23	44	43	13
Virginia	57	31	11	45	36	19	60	30	10
West Virginia	45	39	16	41	54	6	45	39	17

*These percentages are based on student responses to background questions completed as a part of the SREB/National Assessment.

Note: Percentages may not add up to 100 percent due to rounding.

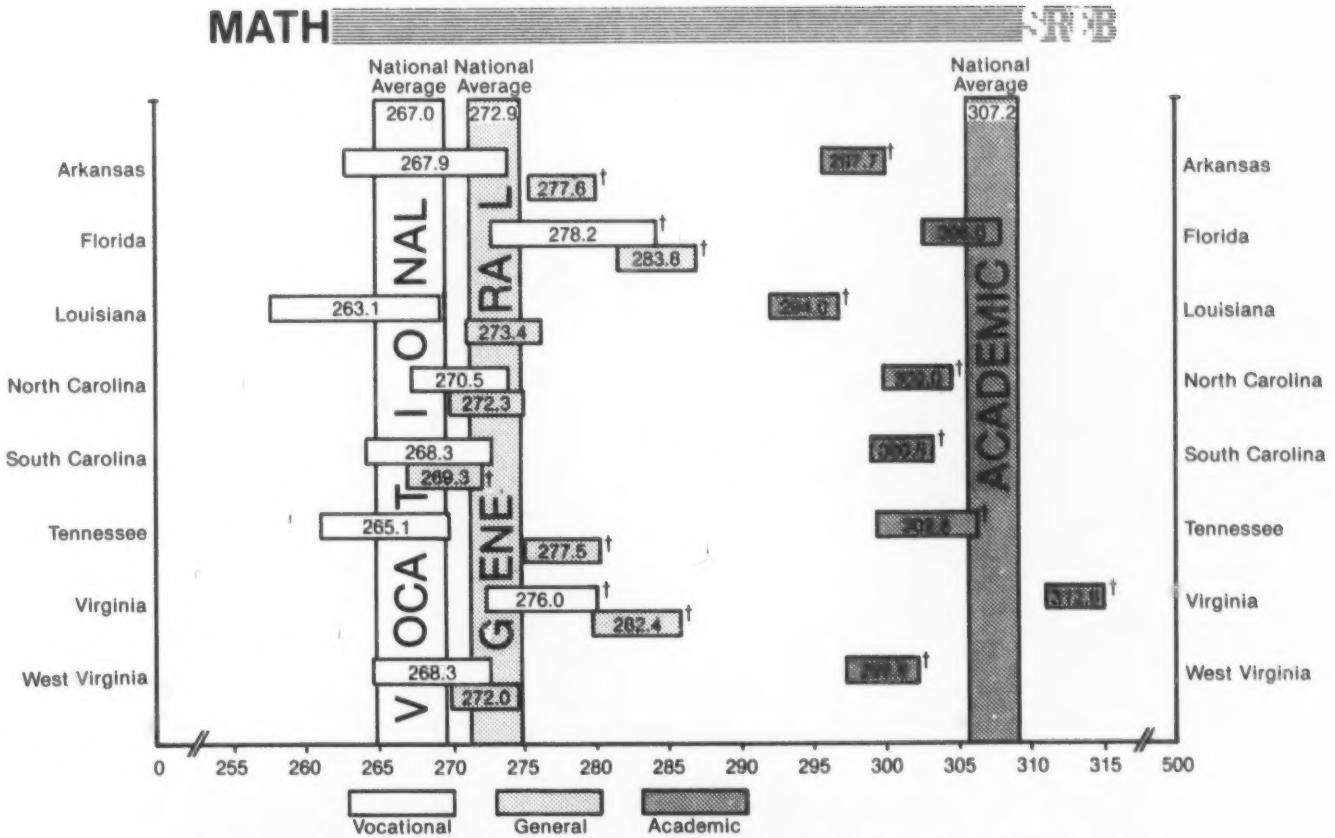
- **Mathematics scores for students in academic programs in six SREB states were below the national average for students who reported being in academic programs; in Florida scores were at the national average, in Virginia scores were significantly above the national average.**

- **Black students in academic programs in six SREB states scored at the national average in mathematics for black students in academic programs; black students' scores in Virginia were significantly above this national average.**

- **In seven SREB states, students in general programs were at or above the average score for students in the nation who reported being in the general high school curriculum.**

- **Vocational/technical students in each of the eight participating SREB states had mathematics scores at or above the national average for students who reported being in vocational/technical programs.**

Figure 4
Average* Mathematics Scores for
11th-Grade Public School Students by
Type of High School Program
as Reported by Students
SREB/National Assessment Project, 1987



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†Significantly different from the national average, based on a statistical test (Alpha = .05). Although South Carolina general students and Tennessee academic students overlap the national average, they are still significantly different from the nation.

Differences in mathematics achievement for students in the SREB states and the nation are related to the different courses that students take in high school. No one should be surprised by the simple fact that students who take more mathematics courses have higher mathematics achievement scores than students who take fewer mathematics courses. Students who do not take mathematics courses through algebra and geometry are clearly at a disadvantage compared to students who have taken these courses.

In many cases, SREB students report taking similar mathematics courses as students in the nation but they have lower mathematics achievement scores (Table 3). About half of all students in both the nation and the participating SREB states report they have taken a general or business mathematics course in high school. Scores for students in four SREB states (Arkansas, Florida, Tennessee, and Virginia) who have taken a general mathematics courses are at or significantly above the national average of 283.3.

- In four SREB states (Florida, North Carolina, South Carolina, and Virginia), the mathematics scores of students who reported taking Algebra I were at or significantly above the national average of 299.4 for Algebra I students. (In the SREB states, the percentage of 11th-grade students who reported having taken Algebra I ranged from 67 to 96 percent. For the nation, the average was 80 percent.)

- In four SREB states (Florida, South Carolina, Virginia, and West Virginia), students who had taken geometry were at or significantly above the national average of 308.3 for students who reported taking geometry. (In the SREB states, the percentage of students taking geometry ranged from 46 to 83 percent. Sixty percent of the nation's students took geometry.)

- In three SREB states (Florida, South Carolina, and Virginia) scores for students who had taken Algebra II were at or significantly above the national average of 312.2 for Algebra II students. (In the SREB states, 38 to 59 percent of the students reported taking Algebra II compared to 47 percent nationally.)

Table 3
Average Mathematics Achievement Scores
And Courses Students Reported Having Taken in High School

	General Math	Algebra I	Geometry	Algebra II	Pre-calculus or Calculus
Nation	52.3%	80.1%	60.1%	46.8%	5.7%
	283.3	299.4	308.3	312.2	333.0
Arkansas	58.7%	82.5%	57.0%	48.3%	2.4%
	281.0	292.8*	302.1*	304.0*	304.2*
Florida	57.5%	80.6%	59.9%	40.9%	3.6%
	287.1*	302.3*	310.0	315.8*	336.0
Louisiana	47.2%	96.3%	82.9%	58.7%	2.2%
	275.9*	285.2*	288.7*	294.6*	305.6*
North Carolina	55.1%	79.2%	64.7%	49.4%	5.4%
	280.0*	297.2	303.4*	308.6*	330.1
South Carolina	47.1%	66.8%	51.1%	38.4%	5.0%
	277.7*	299.9	306.9	311.8	321.4*
Tennessee	54.2%	83.0%	57.1%	47.8%	3.2%
	280.5	293.9*	304.3*	307.5*	324.1
Virginia	50.2%	84.3%	70.4%	56.2%	10.0%
	289.5*	306.9*	313.2*	317.1*	339.7*
West Virginia	61.1%	72.3%	46.1%	37.8%	4.1%
	276.5*	294.6*	305.7	308.5*	323.9

* Significantly different from the national average, based on a statistical test (Alpha = .05).

- In five SREE states (Florida, North Carolina, Tennessee, Virginia, and West Virginia), scores for students who have taken pre-calculus or calculus were at or significantly above the national average of 333.0 for students who have taken pre-calculus or calculus. (In seven SREB states, the percentage of 11th-grade students who reported having taken pre-calculus or calculus was below the national average of 6 percent.)

- While the gap between black and white students who have taken Algebra II was from 19 to 30 points for the SREB states, it was narrower than the 31-point national difference. Scores for black students who have taken Algebra II in seven SREB states were at or significantly above the national average for black students taking Algebra II.

The goal for SREB states should be for their students' achievement to be in line with that of students in the nation who take similar mathematics courses. This is not the case in half of the participating SREB states. This fact should raise several questions, beginning with who actually enrolls in high school mathematics courses and the skills students have when they enter and exit these courses. Key questions must address the content actually taught in the courses. In its Progress Report and Recommendations on Educational Improvements in the SREB States, the Southern Regional Education Board's Commission for Educational Quality recommended that "States and school districts should go beyond citing and counting credits as evidence of real change in high school education. Now, the focus should shift to the content of courses--especially to moving beyond minimum objectives for all students."

U.S. HISTORY ACHIEVEMENT

United States history achievement for 11th-grade public school students is at or above the national average in seven of the SREB states participating in the 1987 SREB/National Assessment project. However, being on par with students nationally does not mean that students have the knowledge of United States history that is desirable.

A recent publication, What Do Our 17-Year-Olds Know? authored by Diane Ravitch and Chester E. Finn, Jr., characterizes the recently published 1986 National Assessment of Educational Progress United States history achievement results for public and private school students as showing that

> "eleventh-grade students earn failing marks"
>
> "the national average of 55 percent [correct answers] on the history portion is a shameful level of performance"
>
> "children learn pretty much what the important adults in their lives make a point of seeing that they learn: in school, at home, and through myriad other means."

The United States history assessment was a knowledge-based test, with multiple-choice questions about historical facts and the chronology of historical development. The results from the nationwide NAEP United States history achievement test showed that private and public school students nationally could answer only half of the questions on chronology, slightly less than 60 percent on civil rights, and only 55 percent of questions about United States history from after World War II until the present.

For the participating SREB states, the United States history achievement results were similar to the national results. In every SREB state, over 85 percent of the public school students could locate the 13 original states on a map, knew that Thomas Jefferson authored the Declaration of Independence, and were aware that the assembly line was introduced in the United States automotive industry. Three-fourths of the students in the SREB states knew that the United States dropped the first atomic bomb on Japan in World War II, and that secession refers to the withdrawal of Southern states from the union.

Placing events in time periods was difficult for students. Only two-thirds of the SREB states' students knew Columbus discovered America before 1750. With the exception of students in Virginia, only one-third knew Jamestown was founded before 1750. Only one-half of the students in the SREB states could place World War II between 1900 and 1950 and only 60 percent knew Watergate had occurred since 1950 (Table 4).

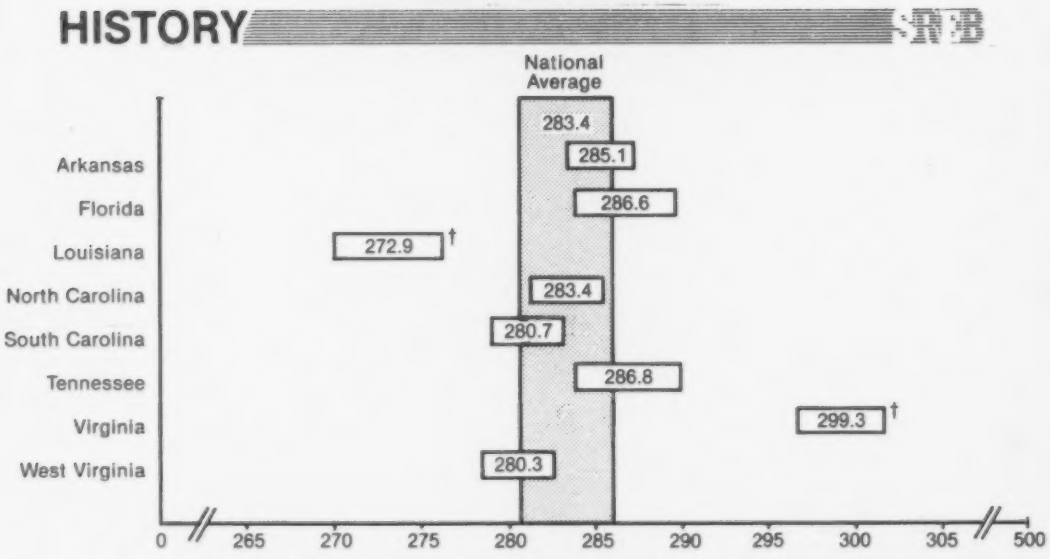
Table 4
History Assessment--Percentage of 11th-Grade Students Who Knew:

	U.S.	AR	FL	LA	NC	SC	TN	VA	WV
Jefferson was primary author of the Declaration of Independence	87%	89%	89%	86%	91%	90%	91%	95%	86%
Television became household feature after 1950	77	77	77	72	75	71	77	82	80
U. S. dropped the first atomic bomb on Japan in World War II	68	78	77	67	75	72	78	80	78
Columbus discovered America before 1750	67	67	66	61	61	61	71	75	61
Watergate occurred after 1950	63	60	60	52	61	59	61	70	67
Spain settled the southwest U.S.	60	59	67	55	56	58	61	66	53
World War II was between 1900 and 1950	56	50	53	45	50	48	56	63	50
Joseph Stalin was the Russian leader during World War II	53	54	57	40	41	49	48	56	50
"Laissez-faire" means minimal government	49	48	58	41	50	53	62	55	51
Jamestown was founded before 1750	37	38	34	30	37	35	39	54	28
Jim Crow laws were to enforce racial segregation	31	25	28	24	27	29	32	37	18

The results for public school students in the eight SREB states show the following for United States history:

- **Scores in United States history achievement for 11th-graders in six SREB states were at the national average; scores for Virginia students were significantly above the national average (Figure 5).**

Figure 5
Average* U.S. History Scores for
11th-Grade Public School Students
in SREB States Participating in
SREB/National Assessment Project, 1987



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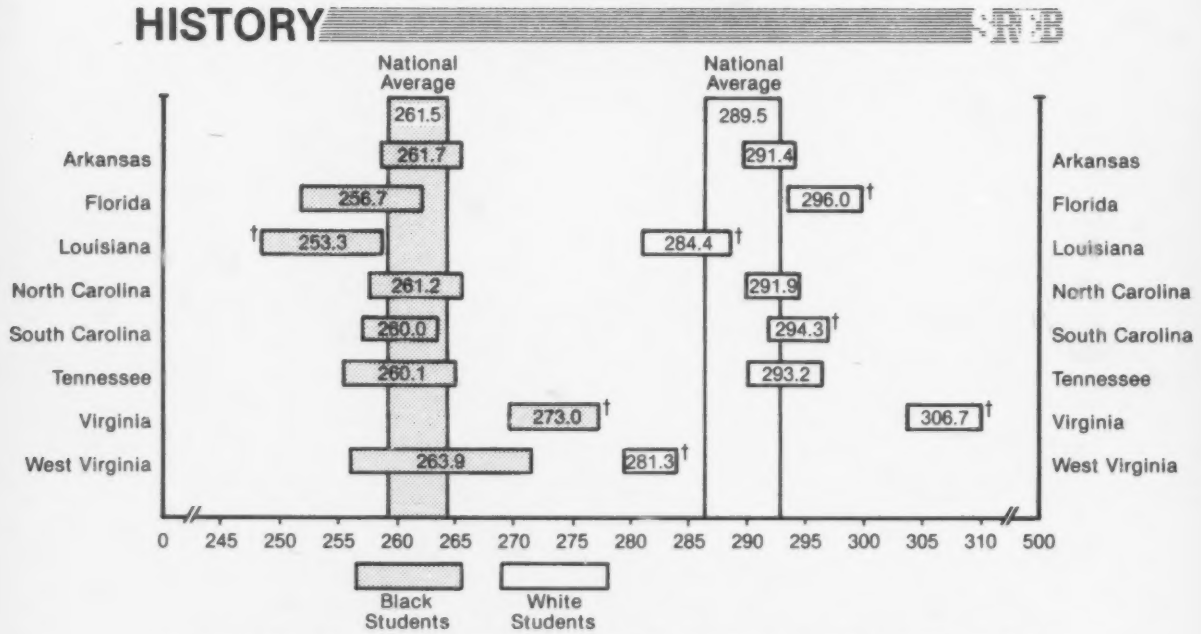
†Significantly different from the national average, based on a statistical test (Alpha = .05).

- **Results were similar when comparing United States history achievement scores for black students in the SREB states with scores for black students nationally.**

- **United States history achievement scores for white students in Florida, South Carolina, and Virginia were significantly above the national average.**

- **The gap between United States history scores for white students and black students was large in every SREB state–from 17 to 39 points (Figure 6).**

Figure 6
Average* U.S. History Scores for
11th-Grade Black and White Public School Students
in SREB States Participating in
SREB/National Assessment Project, 1987



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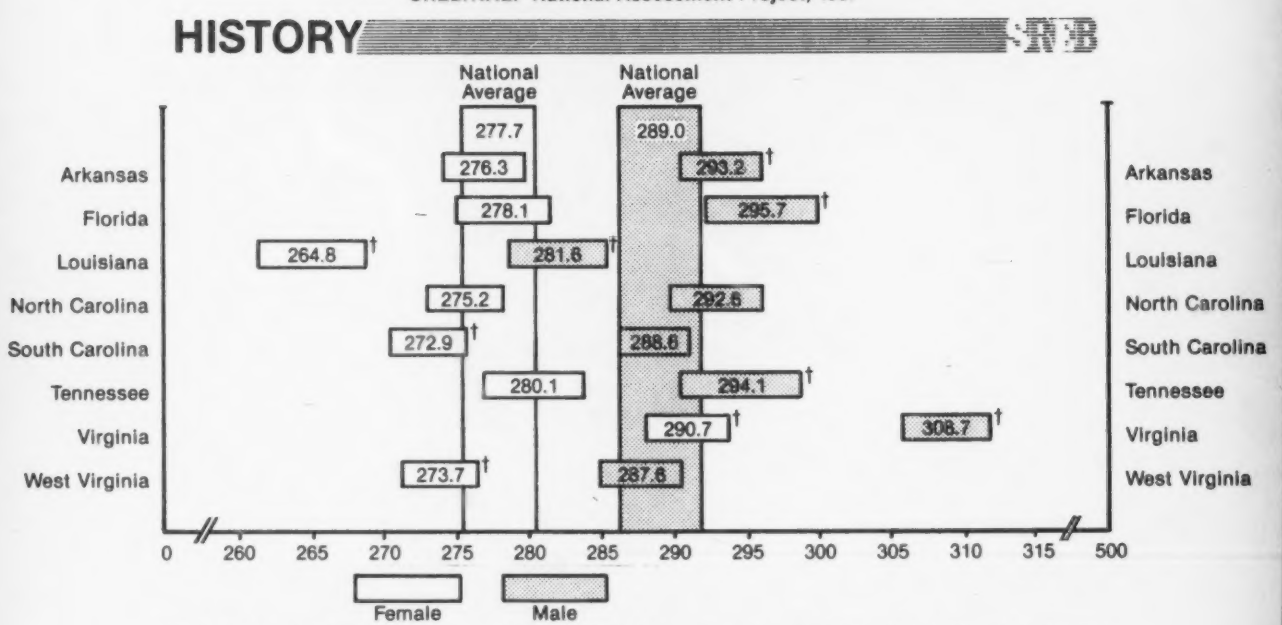
- **Males outscored females in United States history in every participating SREB state, and males in four SREB states (Arkansas, Florida, Tennessee, and Virginia) were significantly above the national average for males (Figure 7).**

Figure 7
Average* U.S. History Scores for
11th-Grade Female and Male Public School Students
in SREB States Participating in
SREB/NAEP National Assessment Project, 1987



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History Courses Students Are Taking in High School

Nationally, and in the participating SREB states, about 85 percent of students reported having taken one year of U.S. history in high school. Forty-five percent of students in the nation reported having taken one year of world history; 25 percent, one year of civics or government; and 23 percent, one year of geography.

That students generally do not know what they have not been taught is demonstrated in the United States history assessment. Achievement scores were 22 points higher nationally for students who had taken one year of U.S. history in high school as opposed to those who had taken none (Table 5).

Test score results such as those in the 1987 SREB/National Assessment project should be analyzed for connections between state policies and student achievement. For example, several years ago West Virginia changed its high school requirements from three units of history to one and one-half units. Most West Virginia students take the full unit of required history in the ninth grade and the remaining one-half unit of history sometime before graduation. Other states may require more units of history or in some states history may be taken most often in the 10th or 11th grades. When students are tested near the end of the 11th grade for their knowledge of history, their scores may be influenced by how much history they have studied and when it was studied.

Table 5
Average U.S. History Achievement Scores
and Courses Students Reported Having Taken in High School

	1 Year U.S. History	No U.S. History
United States	286.3	264.5
Arkansas	286.3	280.5*
Florida	288.3	268.0
Louisiana	275.1*	259.8
North Carolina	286.1	268.4
South Carolina	283.3	263.3
Tennessee	289.7	271.3
Virginia	301.6*	287.6*
West Virginia	281.2*	255.7

* Significantly different from the national average, based on a statistical test (Alpha =.05).

Nationally, and in the SREB states, around 10 percent fewer black students than white students reported having taken one year of U.S. history. Nationally, 4 percent fewer black students reported having taken one year of world history, while in the SREB states from 4 to 18 percent fewer black students reported having taken this course. In Louisiana, 4 percent more black students than white students reported having taken world history.

Students in the SREB states reported on their perceptions of classroom practices in U.S. history classrooms. About 70 percent of students reported teachers talked most of the time in class and that history textbooks were used on a daily basis. From 30 to 45 percent of the students reported that they never discussed or analyzed information in small groups. From one-fourth to one-fifth of the students indicated that teachers never commented on their work, in contrast to about 10 percent of the students who said that they received comments daily.

ELEVENTH-GRADE STUDENTS' HIGH SCHOOL ACHIEVEMENT AND PLANS FOR COLLEGE ATTENDANCE

Students who participated in the 1987 SREB/National Assessment testing project were in the final months of their junior year in high school. As a part of the mathematics and U.S. history tests, they were asked questions not only about their high school courses and experience, but also about possible additional education. These responses were self-reported and should be considered with other information in drawing conclusions.

The percentage of 11th-graders who said they plan to attend a four-year college was somewhat larger than the percentage who were enrolled in an academic program in high school (Table 6). In the 1987 SREB/National Assessment of mathematics, students in almost all of the participating SREB states who plan to attend four-year colleges had mathematics scores below the average for students nationally with similar plans.

Table 6
Percent* of 11th-Grade Public School Students Enrolled in Academic Program and Percent Intending to Go to College, by Total and Race, *as Reported by Students*
in SREB States Participating in SREB/National Assessment Project, 1987

	Total			Black			White		
	Academic Program	Going to College		Academic Program	Going to College		Academic Program	Going to College	
		2-yr.	4-yr.		2-yr.	4-yr.		2-yr.	4-yr.
Arkansas	45%	17%	55%	43%	14%	57%	45%	18%	54%
Florida	52	28	49	52	20	58	53	30	46
Louisiana	51	14	58	49	13	60	53	15	57
North Carolina	54	24	52	48	23	54	57	25	52
South Carolina	54	22	51	44	21	47	60	23	54
Tennessee	44	19	52	44	18	53	44	19	51
Virginia	57	16	61	45	18	56	60	15	61
West Virginia	45	17	49	41	9	55	45	17	49

*These percentages are based on student responses to background questions completed as a part of the SREB/National Assessment.

Scores from the 1986 SREB/National Assessment of reading showed that about 40 percent of 11th-grade students had the reading proficiency probably needed for college-level work. This was true for the nation and the SREB states. And yet, the number of high school students going to college is a good bit higher than this. The 1986 reading and 1987 mathematics results underscore questions about college readiness and remedial education--questions for high schools and colleges.

For black students the contrasts between plans for college attendance, enrollment in college preparatory courses in high school, and actual college attendance highlight a serious problem. A significantly larger percentage of black students said they plan to attend college than are enrolled in high school academic programs. There is little difference between what white and black high school juniors say about their plans to attend college. But generally black students are not as likely to take the recommended high school courses for college preparation or to enroll in and complete four years of college.

- The percent of 11th-grade students in SREB states that reported they were in academic programs ranged from a low of 44 percent in one state to 57 percent in another, while 49 to 61 percent indicated that they planned to attend a four-year college. An additional 14 to 28 percent said they wanted to attend a two-year college.

- Among the eight SREB states, from 46 to 60 percent of black students reported that they planned to attend four-year colleges; 41 to 52 percent reported they were in academic programs. An additional 9 to 22 percent said they planned to attend two-year colleges.

These figures for all students and those for black students illustrate that student aspirations in many cases do not materialize, as the percentage of high school graduates who enroll in college is smaller than these responses would indicate.

Students who plan to attend a four-year college

SREB students planning to attend four-year colleges scored higher in mathematics and history than those planning to attend two-year colleges.

- In seven SREB states, students planning to attend four-year colleges scored significantly below the average in mathematics for those students nationwide who plan to attend a four-year college. Only in Virginia did students planning to attend a four-year college score at the national average.

- Black students in every participating SREB state scored at the national average in mathematics for black students planning to attend a four-year college.

- Students in Arkansas, Florida, North Carolina, South Carolina, Tennessee, and Virginia planning to attend a four-year college scored at or significantly above the national average in history.

Students who plan to attend a two-year college

- Eleventh-graders in six SREB states (Arkansas, Florida, North Carolina, South Carolina, Tennessee, and Virginia) planning to attend two-year colleges scored at or significantly above the national average in mathematics for students across the nation with similar plans.

- Black students in every participating SREB state planning to attend a two-year college had mathematics scores significantly above the national average for black students planning to attend a two-year college.

- In four SREB states (Arkansas, Florida, North Carolina, and Tennessee), students planning to attend two-year colleges were at the history achievement average for students nationally who said they were planning to attend a two-year college. Virginia students were significantly above the national average.

- History scores for black students in Arkansas, North Carolina, South Carolina, Virginia, and West Virginia who plan to attend two-year colleges were at the national average for black students who plan to attend two-year colleges.

In each of the participating SREB states, a smaller percentage of black students than white students reported having taken algebra courses. In several states at least 10 percent fewer black students than white students reported having taken Algebra I. This difference nearly doubles for students who reported having taken Algebra II. Rarely do students who do not complete Algebra I enroll in a four-year college. Increasingly, colleges require Algebra II for entering students. That black students will likely be underrepresented in four-year colleges for some years to come can be seen in the present high school algebra enrollments.

As noted earlier it is clear that students who take more mathematics courses have higher mathematics achievement. Recent increases in high school graduation standards have meant an additional year of mathematics study in nearly every state. States should be in a position in a year or two to begin to assess how the increased standards affect mathematics achievement.

Overall the proportions of students in participating SREB states who reported they were in academic programs were similar to those for the nation. But mathematics scores for SREB students who reported that they had taken courses such as algebra and geometry were lower than the scores for students in similar programs nationally.

In U.S. history, students in the SREB states who reported having taken courses similar to those taken by students nationally achieved at similar levels. However, the level of U.S. history knowledge demonstrated by all students does not bode well for moving into higher levels of teaching and understanding in history, government, and civics.

Again this raises questions for schools and colleges. As noted by Ravitch and Finn (What Do Our 17-Year-Olds Know?), "Other than the schools themselves, no institutions bear greater responsibility for the condition of history . . . than colleges and universities. Not only do they train teachers, but they also set standards of admission for entering students that signal to students, teachers, and school authorities whether the study of history . . . is necessary to enter or succeed in higher education."

METHODOLOGY SUMMARY: THE 1987 SOUTHERN REGIONAL EDUCATION BOARD/ NATIONAL ASSESSMENT OF EDUCATIONAL PROGRESS

In 1987 eight states administered an assessment of mathematics and U.S. history to representative state samples of 11th-grade students. The program included Arkansas, Florida, Louisiana, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia.

The tests consisted of questions used in the 1986 National Assessment of Educational Progress. NAEP assessments are developed through a consensus process. Educators and citizens representing many diverse constituencies design objectives for each subject area. The objectives are then given to writers who develop assessment questions. All of the questions undergo extensive reviews by subject-matter and measurement specialists, as well as careful scrutiny intended to eliminate any potential bias or lack of sensitivity to particular groups.

Within each state, a stratified random sample of schools from all regions and types of communities was selected. Within each school, a random sample of students was selected to participate. The results estimate achievement of all 11th-grade students in the public schools in these states. Results are not reported for individual students, schools, or districts.

To permit simple estimation of standard errors, the sample was selected in the form of two sub-samples, and was designed to achieve approximately 100 clusters of 20 students each. This resulted in roughly 2,000 students completing the mathematics and U.S. History assessments in each state.

The 11th-grade SREB/National Assessment in mathematics consisted of two separately-timed blocks of questions that included multiple-choice items and questions that required students to generate their own answers. There were also subject-specific background questions--such as how often students do mathematics homework--followed by mathematics achievement questions on routine math procedures, probability, analyzing data, units of measure, geometry, equations, words to symbols, and computation of fractions, integers, and percents.

The 11th-grade SREB/National Assessment in U.S. History contained one block of multiple-choice questions and a background section, including questions such as how often students used a history book. Understanding history involves both knowing important names, dates, and places and grasping how events are woven together. This assessment focused only on student knowledge of specific facts related to U.S. history. The content of the SREB/National Assessment in U.S. history was: Exploration/Colonization to 1763, Revolutionary War/New Republic--1763-1815, Nationhood/Sectionalism/Civil War--1815-1877, Territorial Expansion/Rise of Modern Era/World War II--1877-1920, Great Depression/New Deal/World War II--1920-1945, and Post-World War II--1945-Present.

The data from the SREB/National Assessment project were summarized using IRT (Item Response Theory) methods. The results were placed on a 0-500 point scale that reflected the achievement of public school students in the nation, as determined by the 1986 national assessment. The mathematics national mean was set at 289 with a standard deviation of 40. The mean and standard deviation for the 0-500 scale for U.S. history were set at 283 and 40, respectively. (A more detailed description of the methodology of the 1987 SREB/National Assessment project may be obtained from the Southern Regional Education Board.)

Appendix A
Number of Schools Participating in SREB/National Assessment Project, 1987, By State

Arkansas	85
Florida	86
Louisiana	105
North Carolina	90
South Carolina	76
Tennessee	81
Virginia	85
West Virginia	72
Total	680

Note: Ninety-seven percent of the schools that were asked agreed to participate in the project.

Appendix B
Average Mathematics Scores for 11th-Grade Public School Students by Total, Race, and Gender in SREB States Participating in SREB/National Assessment Project, 1987

	Total	Race		Gender	
		Black	White	Female	Male
Nation	289.0 (0.8)	261.4 (1.3)	295.6 (0.7)	286.5 (0.8)	291.5 (1.1)
Arkansas	285.7† (0.9)	264.8 (1.6)	291.3† (1.0)	283.0† (1.1)	287.8† (1.2)
Florida	294.3† (1.2)	270.6† (2.0)	301.8† (1.2)	292.1† (1.2)	296.8† (1.6)
Louisiana	283.1† (1.1)	265.5 (2.1)	293.9 (1.2)	281.0† (1.3)	285.4† (1.5)
North Carolina	288.0 (1.0)	269.1† (1.8)	295.2 (1.1)	285.8 (1.3)	290.3 (1.6)
South Carolina	285.9† (0.9)	267.6† (1.1)	297.9 (1.0)	283.2† (1.0)	288.8 (1.2)
Tennessee	286.6 (1.4)	267.9† (1.8)	290.9† (1.5)	284.7 (1.5)	288.5 (1.7)
Virginia	299.1† (0.9)	275.5† (1.7)	305.3† (1.1)	295.1† (1.3)	303.4† (1.4)
West Virginia	283.6† (1.1)	265.7 (3.2)	284.6† (1.1)	281.0† (1.3)	286.5† (1.3)

Note: Numbers in ( ) represent the standard error. The standard error is a function of the size of the sample and the variability of scores within that sample.

†Significantly different from the national average, based on a statistical test (Alpha = .05).

Appendix C
Average U.S. History Scores for 11th-Grade Public School Students by Total, Race, and Gender in SREB States Participating in SREB/National Assessment Project, 1987

	Total	Race		Gender	
		Black	White	Female	Male
Nation	283.4 (1.3)	261.5 (1.2)	289.5 (1.6)	277.7 (1.3)	289.0 (1.4)
Arkansas	285.1 (1.0)	261.7 (1,8)	291.4 (1.1)	276.3 (1.4)	293.2† (1.4)
Florida	286.6 (1.4)	256.7 (2.7)	296.0† (1.6)	278.1 (1.6)	295.7† (1.9)
Louisiana	272.9† (1.5)	253.3† (2.5)	284.4† (1.8)	264.8† (1.7)	281.6† (1.8)
North Carolina	283.4 (1.0)	261.2 (2.0)	291.9 (1.1)	275.2 (1.3)	292.6 (1.7)
South Carolina	280.7 (1.0)	260.0 (1.5)	294.3† (1.2)	272.9† (1.3)	288.6 (1.2)
Tennessee	286.8 (1.5)	260.1 (2.4)	293.2 (1.6)	280.1 (1.7)	294.1† (2.0)
Virginia	299.3† (1.2)	273.0† (1.9)	306.7† (1.5)	290.7† (1.5)	308.7† (1.5)
West Virginia	280.3 (1.1)	263.9 (4.0)	281.3† (1.1)	273.7† (1.3)	287.6 (1.5)

Note: Numbers in ( ) represent the standard error. The standard error is a function of the size of the sample and the variability of scores within that sample.

†Significantly different from the national average, based on a statistical test (Alpha = .05).

Acknowledgments

The list of key persons from participating SREB states involved in the three-year pilot project with the National Assessment of Educational Progress is a long one. Government leaders included numerous governors and legislators. From the state educational leadership, chief state school officers and state testing directors were instrumental in developing the project. Several thousand schools and tens of thousands of high school students participated with the support of principals, teachers, and school district staff.

Members of the staff of the National Assessment of Educational Progress, which is administered under federal contract by Educational Testing Services, helped make the project possible and successful. Archie Lapointe, executive director, Douglas Rhodes, associate director, Albert Beaton, director for statistical and data analysis, and their staffs worked with state and SREB staff on a continuing basis.

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